

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 5-7, 9 and 11-14 are presently active in this case, Claims 1-4, 8 and 10 canceled and Claims 5-7 amended and Claims 11-14 added by way of the present amendment.

In the outstanding Official Action, Claims 1-4 were rejected under 35 U.S.C. § 102(b) as being anticipated by either J.C. Zolper, 1999 International Electron Devices meeting, Technical Digest, pages 389-392, "Wideband Gap Semiconductor Microwave Technologies: From Promise to Practice" (hereafter "Technical Digest"), or S. Yoshida, The Furukawa Electric Company, Ltd., Vol. 68, No. 7, pages 787-792, "Electronic Device Using GaN" hereafter "Butsuri"); and Claims 5-10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,150,798 to Ferry et al. in view of Technical Digest.

First, Applicants wish to thank Examiner Berhane for the December 16, 2003 personal interview, at which time the outstanding issues in this case were discussed. During the interview, Applicants presented amendments and arguments substantially as indicated in this response. While no agreement was reached, Examiner Berhane indicated that the amendments discussed would be given further consideration once submitted in a formal response.

Turning now to the merits, in order to expedite issuance of the patents in this case, Applicants have amended independent Claim 5 to clarify the patent distinctions of the present invention over the cited references. Specifically, Applicants' Claim 5 recites a power supply apparatus including a field effect transistor that is disposed in the path of a main current that is a subject of power control, and includes a substrate, a gallium nitride buffer layer formed on the substrate, a gallium nitride layer formed on the gallium nitride buffer layer, and an n-

type aluminum gallium nitride layer formed on the gallium nitride layer. Also recited is a control circuit which conducts switching control on conduction of the main current flowing through the field effect transistor. As discussed in the December 16th interview, the structure recited in Claim 5 addresses several problems related to prior art power supply apparatus.

Specifically, as discussed in the Background section of Applicants' specification, prior art power supply apparatus included a silicon based element as a switching element. As also discussed in the background section, such a power supply apparatus required use of a radiating element, which made the power supply apparatus undesirably large and heavy. Moreover, the necessity for a radiating element limited the design possibilities for the prior art power supply apparatus including the silicon based switching element. A power supply apparatus having the gallium nitride switching element as claimed in Claim 5, has a reduced size and weight, and can be flexibly designed because the apparatus does not require a radiating element.

As discussed in the December 16 interview, the cited reference to Ferry et al. discloses a conventional voltage regulator having silicon based semiconductor switching elements. As acknowledged by the outstanding Official Action, Ferry et al. does not disclose using a GaN compound as a switching device. With regard to the Technical Digest and Butsuri references, while these references disclose the existence of gallium nitride components, neither of these references disclose the specific structure of the gallium nitride switching component now recited in Claim 5. Further, as the technical digest reference is directed to microwave applications and the Butsuri reference includes a theoretical discussion of gallium nitride device physics, there is no discussion in either of these references suggesting that a gallium nitride switching element be used in a power supply apparatus. Thus, one of ordinary skill in the art would not be motivated to combine the general teachings of a gallium nitride device in the technical digest and Butsuri references with the power

supply circuit of Ferry et al. without knowledge of Applicants' Background section describing the design constraints of conventional silicon based switching element power supply apparatus. Of course, this is improper hindsight reasoning.

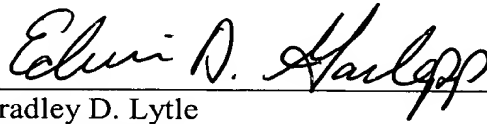
Therefore, Claim 5, as amended patentably defines over the cited references. Moreover, as Claims 6-7 and new Claims 11-14 depend from Claim 5, these claims also patentably define over the cited references. In this regard, Applicants note that Claim 7 has been amended to recite that a plurality of field effect transistors having the GaN structure as spatially adjacent to each other. As none of the cited references disclose this limitation, this provides a further basis for patentability of Claim 7 over the cited references.

With regard to original Claim 9, as discussed in the December 16 interview, this claim recites a power supply circuit having a transformer and which conducts ON/OFF control on voltage applied to a primary winding of the transformer, and thereby supplies a stabilized power supply voltage to a secondary winding side of the transformer. The power supply circuit further comprises a GaN-FET connected to the primary winding of the transformer and ON/OFF-controlled by a gate signal. As discussed above with respect to Claim 5, none of the cited references disclose a GaN switching device used in a power supply circuit. Moreover, as acknowledged by Examiner Hane in the December 16 interview, none of the cited references disclose a transformer. Thus, Claim 9 also patentably defines over the cited references.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application and the present application is believed to be in condition for formal allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Bradley D. Lytle
Registration No.: 40,073

Edwin D. Garlepp
Registration No. 45,330

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)

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